

---

**| RESEARCH ARTICLE**

## **The Study of Environment and Plant Landscape of the Garden of Mountain Russa (Jardim Municipal da Montanha Russa) in Macau**

**Yile Chen<sup>1</sup>** ✉ and **Junxin Song<sup>2</sup>**

<sup>1,2</sup>*Faculty of Humanities and Arts, Macau University of Science and Technology, Avenida Wai Long Taipa, Macau SAR, China*

**Corresponding Author:** Yile Chen, **E-mail:** 2009853gat30001@student.must.edu.mo

---

**| ABSTRACT**

Garden of Mountain Russa (Jardim Municipal da Montanha Russa) is a municipal park built in the 19th century in Macau. Because it was located on the edge of the city at the initial stage of construction, near the cemetery, it gradually became abandoned. However, 40 years ago, it was renovated and opened to the public. It belongs to a small-scale hill-type park in a high-density city and has robust research significance for the early native tree species in Macau. The objective of the study is to analyze the environment and plant configuration of small municipal parks in a high-density city and Macau with limited land resources. The results of the study revealed common planting patterns in small municipal parks of mountain type and seasonal analysis of native tree species and plants in Macau. However, due to the problems of diseases and insect pests and improper human handling in the current plant landscape environment, three corresponding solutions were proposed at last.

**| KEYWORDS**

Environment, Plant Landscape, Garden of Mountain Russa, Macau

**| ARTICLE INFORMATION**

**ACCEPTED:** 05 August 2022

**PUBLISHED:** 10 August 2022

**DOI:** 10.32996/jeas.2022.3.2.5

---

### **1. Introduction**

Garden of Mountain Russa (Jardim Municipal da Montanha Russa), also known as Má Káu Séak Park, is located on a hill between Mong Há Mountain (Colina de Mong Há) and Má Káu Séak Mountain in Macau, with an altitude of more than 30 meters and an area of about 9366 square meters. The park has two entrances, one on Estrada da Bela Vista and one on Estrada de Ferreira do Amaral. In 1993, the Macau Portuguese government announced a list of assessed monuments, buildings of architectural value, building complexes, and locations. The "Annex 4: List of Assessed Locations" included Garden of Mountain Russa. It can be seen that the historical value of the park was assessed by the Macau government before returning to the motherland.

### **2. Construction history**

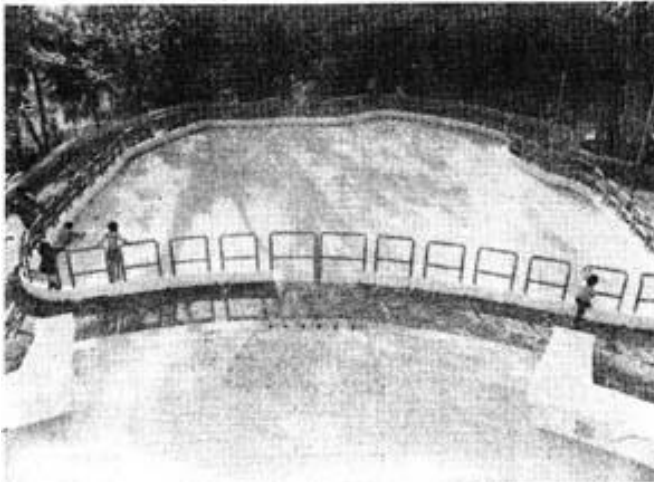
In the 24th year of Emperor Guangxu of the Qing Dynasty (January 22, 1898-February 9, 1899), the Macau Portuguese government built the Garden of Mountain Russa at Má Káu Séak, on the northeast coast of Macau. The garden was designed and built by Portuguese architect Augusto César d'Abreu Nunes.

The Macau Portuguese government turned it into a scenic spot because of its beautiful scenery and called it Bell View, which means beautiful scenic spot. The park was built in 1898. There is a screw-shaped artificial rock mountain at the highest point in the park, so it was named Garden of Mountain Russa (Jardim Municipal da Montanha Russa). In the past, it was located on the outskirts of the city and was a good place for residents to go out and have a picnic on holidays. It is said that Russians once lived there. At that time, the relevant departments still called this mountain Russian Mountain, but when it was translated into Chinese, it became Mountain Russa. Later, when developing the Garden of Mountain Russa (Jardim Municipal da Montanha Russa), two

mountaineering trails were built, which spiraled upwards, and a pavilion and a small spiral tower were built on the mountain. All kinds of common flowers and trees are planted on both sides of the trail.

In 1869, the committee responsible for the study of "improving the environment of Macau" proposed "purifying the environment" and promoting the cultivation of trees and shrubs. At that time, the then-governor, Tomda Rosa, implemented plans to green Macau and open up parks, among which Garden of Mountain Russa is one of them. With the continuous development of society, the park began to become dilapidated.

In 1985, Major ANTUNES, MANUEL PAULO, Mayor of the Macau Português Government, stated that the Engineering Department of the Leal Senado<sup>1</sup> submitted a proposal to the Municipal Committee for study the day before yesterday. The facilities are fully renovated for public recreation. In April of the same year, the Leal Senado awarded the builder Leong Ping Chiu Constructor Civil<sup>2</sup> the work on fully renovating the Garden of Mountain Russa. The project started after the contract was signed and was completed within 120 working days at the cost of 1,059,035 MOP<sup>3</sup>. The project was to fully renovate the desolate park and make it a place for citizens to rest and play again. The works include re-installing more than 20 lampposts, improving the night lighting in the park, repairing the bad roads in the park, improving the sewer system, increasing the facilities in the park, building a cafe in the park, building a snowshoe field and replanting flowers and trees. The appearance of Mountain Russa will be preserved. It was rebuilt and opened to the public in 1986. Every September 9th Climbing Festival, every time the citizens come to the heights, one will climb the mountain, and the other will have the meaning of transshipment.



**Figure 1.** Snow track on Garden of Mountain Russa



**Figure 2.** Garden of Mountain Russa Restaurant and Pavilion

Image Source: Macau Vakiodyaily

Until January 1989, to commemorate the centenary of the death of the educator San Giovanni Melchiorre Bosco<sup>4</sup>, a large fiber statue of San Giovanni Melchiorre Bosco was placed in front of the Garden of Mountain Russa. The fiber statue is about two meters high. It was made in the Philippines and shipped to Macau for installation. The installation site of the statue is diagonally opposite

<sup>1</sup> Municipal Council of Macau, officially known as the Leal Senado (Portuguese for Loyal Senate), was the local government structure in Macau (similar to city councils) during Portuguese colonial rule. The title Leal Senado was bestowed on Macau's government in 1810 by Portugal's Prince Regent João, who later became King John VI of Portugal. This was a reward for Macau's loyalty to Portugal during the Philippine Dynasty, between 1580 and 1640. Following the handover in 1999, the Council was replaced by a Provisional Municipal Council and finally replaced by the Institute for Civic and Municipal Affairs of the Macau (Instituto para os Assuntos Cívicos e Municipais). Like its Municipal Council predecessors, the Institute meets at the Leal Senado Building.

<sup>2</sup> 梁炳照 (Leong Ping Chiu Constructor Civil)

<sup>3</sup> The Macau pataca or Macanese pataca (Chinese: 澳門圓; Portuguese: pataca de Macau; sign: MOP\$; code: MOP) is the currency of the Macau Special Administrative Region of the People's Republic of China. It is subdivided into 100 avos (仙; sin), with 10 avos called ho (毫) in Cantonese. The abbreviation MOP\$ is commonly used. Macau has a currency board system under which the legal tender, Macau pataca, is 100 percent backed by foreign exchange reserves, in this case currently the Hong Kong dollar (itself backed by the United States dollar). Moreover, the currency board, Monetary Authority of Macau (AMCM), has a statutory obligation to issue and redeem Macau pataca on demand against the Hong Kong dollar at a fixed exchange rate of HK\$1 = MOP\$1.03, and without limit.

<sup>4</sup> Giovanni Melchiorre Bosco; 16 August 1815, popularly known as Don Bosco, was an Italian Catholic priest, educator, and writer of the 19th century. While working in Turin, where the population suffered many of the ill-effects of industrialization and urbanization, he dedicated his life to the betterment and education of street children, juvenile delinquents, and other disadvantaged youth. He developed teaching methods based on love rather than punishment, a method that became known as the Salesian Preventive System.

the main entrance of High School, Colégio dom Bosco (Yuet Wah),<sup>5</sup> that is, in front of the Garden of Mountain Russa. The fiber statue was purchased and installed by the Federação dos Antigos Alunos Salesianos de Macau Federation of Don Bosco Alumni to commemorate the centenary of the death of the educator San Giovanni Melchiorre Bosco.

In 1993, Garden of Mountain Russa carried out maintenance of lighting equipment, totaling 39750 MOP, which was undertaken by Hyup Sung Company. In 1995, the replacement of the lighting system of Garden of Mountain Russa was won by Consolidated Engineering Co., Ltd.<sup>6</sup>, the project contractor. The project cost was 828780 MOP, and the construction period was 45 days.

Since 1996, the Garden of Mountain Russa Restaurant has been leased out by Leal Senado. The monthly rent is set at 11600 MOP, and the rent is set to increase by a certain percentage every year. However, the tenants have paid the old rent every year since 1996. The Leal Senado did not increase the rent every year as stipulated in the lease agreement but charged the old rent for nearly a year. The restaurant dealt with Portuguese cuisine. Many of the people working near the restaurant at the time were civil servants. They returned to Portugal to opt into the establishment. In addition, nearby works were carried out, which greatly reduced the business volume. In 1998, Leal Senado agreed to reduce the rent from the original 11600 MOP monthly rent to 7500 MOP in consideration of the downturn in the city and the difficulties of the tenants.

### 3. Scene after restoration

After the restoration, there is a screw-shaped artificial lookout in the center of the park, and visitors can follow the spiral path to the top, which is the characteristic of the park. There is a charging children's electric car park next to the screw-shaped observatory. It is open from 8:00 am to 8:00 pm every day and charges 5 MOP per 15 minutes. It is suitable for children aged three to six. In the past, from the top of Mountain Russa, you could overlook the former "Areia Preta Beach", but today you can look at the scenery of the Areia Preta District and the area of Rua Dos Pescadores. Until now, the construction of the park has been getting better and better. The native plants that were planted that year have also been well maintained.



**Figure 3.** Walking trails in the Garden of Mountain Russa (Image source: The author took the photo in August 2022)

<sup>5</sup> Colégio Dom Bosco (Yuet Wah) was originally an orphanage (Asilo dos Orfaos) which was run by the Salesians, specifically accommodating Portuguese orphans. In 1941, since the Portuguese Salesians did not have their own premises, the orphans had to stay in the Immaculate Conception Orphanage (now Instituto Salesiano) with the Chinese orphans. Because of a number of problems, the foundation stone laying ceremony was delayed until 1949, and the school was named Colégio Dom Bosco de Artes Oficios, and later referred to as Colégio Dom Bosco. The Salesians started to use part of the new building in 1951 providing technical and vocational education. The construction of the school was completed in 1963. At that time, it was a boarding school which provided vocational and preparatory courses. The curriculum was the same as that used in Government schools. In addition, the school provided mechanics, typing, computer and other programs for many years. This led to the development of technical education in Macau.

<sup>6</sup> Consolidated Engineering Co., Ltd. was established in 1985. Consolidated is an experienced Electrical and Mechanical Engineering Company in Macau.



**Figure 4.** Walking trails in the Garden of Mountain Russa

**Figure 5.** Remaining house and drain in the Garden of Mountain Russa  
(Image source: The author took the photo in August 2022)

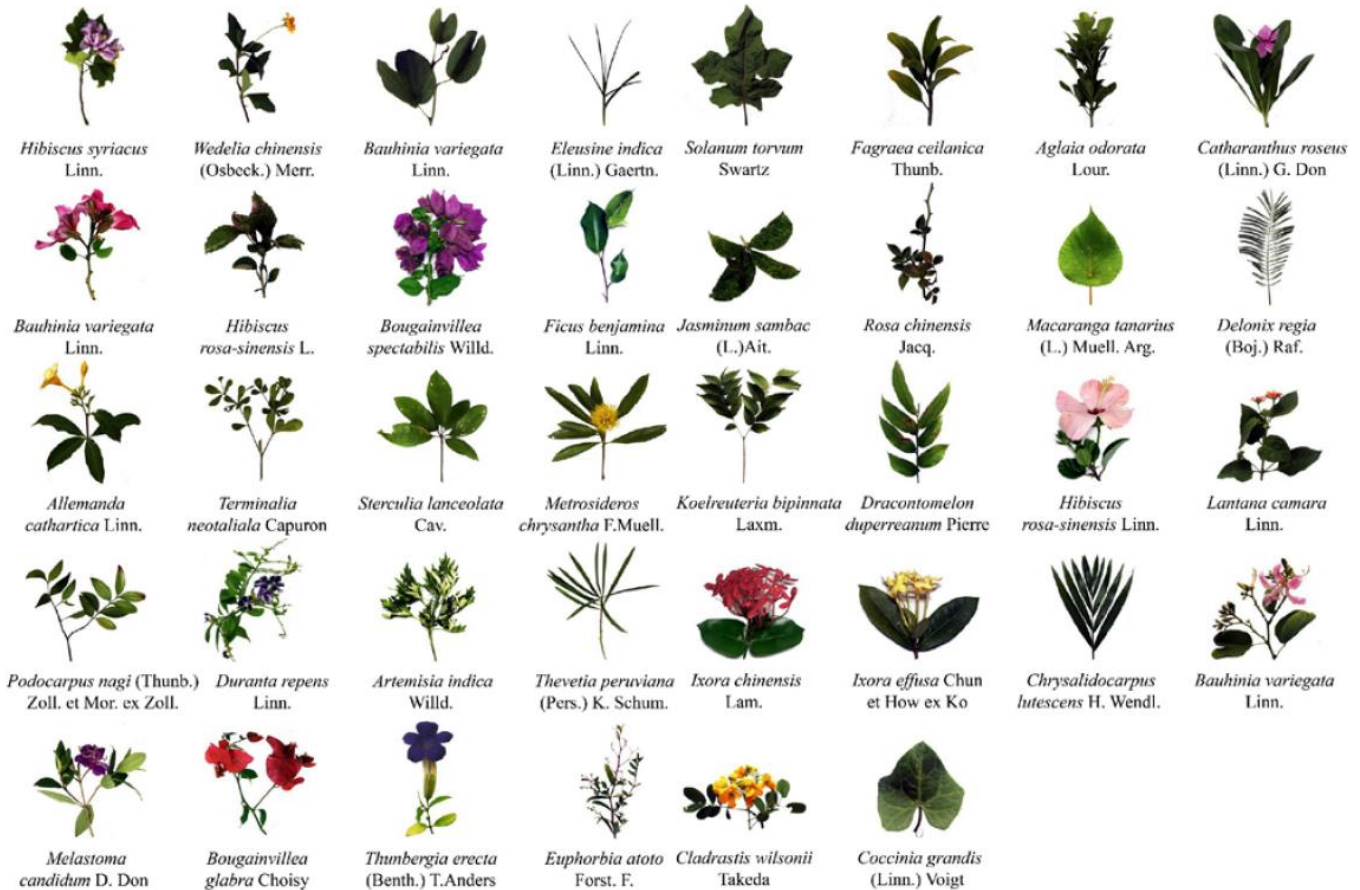
#### **4. Plant Landscape and Environmental Analysis**

Although the area of Mountain Russa is small, there are many local tree species, such as *Celtis sinensis Pers*, *Litsea glutinosa*(Lour)C.B.Roxb., *Syzygium levinei* Merr. et Perry, *Trifolium repens* L., *Catunaregam spinosa* (Thunb.) Tirveng., *Microcos*. Among them, there are several *Sterculia lanceolata* Cav planted in the forest. During the fruiting period in summer and autumn every year, bright red fruit shells are decorated with black seeds and hang over the treetops, forming the unique landscape of Mountain Russa.

##### **4.1 Seasonal analysis of plants**

The so-called plant season refers to the appearance of plants in different seasons. During the growth of plants throughout the year, the shape and color of leaves, flowers, and fruits change with the seasons. It has high ornamental value when flowering, when fruiting, or when leaf color changes.

In landscape planning, the seasonal phase of plants occupies a large proportion. This reflects the changes in the scene throughout the year. From spring to autumn, the scenery of spring, summer, autumn, and winter is different. There are also changes in the plant itself. Its colors change with every season; buds and leaves have a taste. I live all year round in South China, which is located in the subtropical zone. The gardens with rich plant landscapes are in constant bloom throughout the four seasons, and the four seasons are gorgeous. For example, in Yuyin Garden, one of the four famous gardens in central Guangdong in the Qing Dynasty, which I often visited when I was an undergraduate, weeping willows sprout in spring, and the weeping willows are a new green scene. At the end of summer and the beginning of autumn, the crape myrtle flowers bloom on the branches, and they are purple-red.



**Figure 6.** Major native tree species in Macau

(Image source: Zheng Liang, & Chen Yile. Analysis of the Plant Landscape Planning of Macau Campus: Taking Macau University of Science and Technology as an Example)

Entering the main entrance, the first things that catch the eye are several huge and lush *Erythrina variegata* trees, one of which is 103 cm in diameter at breast height and one of the two largest *Erythrina variegata* trees on the Macau Peninsula. Every year in late winter and spring, bright red butterfly-shaped flowers fill the trees, adding a lot of color to the park. On the left side of the main entrance platform, there is an ancient big tree, *Syzygium hainanense* Chang et Miau. Going forward along the road, I saw ancient big trees and *Ficus rumphii* (Mock Bodh tree) trees everywhere around the park, on the roadside, and on the hillside. Inside the back gate of the park, there is an ancient large *Cinnamomum camphora* tree with a diameter of 90 cm, which has been included in the ancient tree list of Macau. A variety of trees completely cover the park under the shade of green trees and completely separate it from the outside, making the whole park very peaceful. Strolling along the winding paths in the garden, interspersed with the shade of green trees, in a quiet and quiet environment, you can enjoy the soft breeze brought by summer and feel very comfortable.

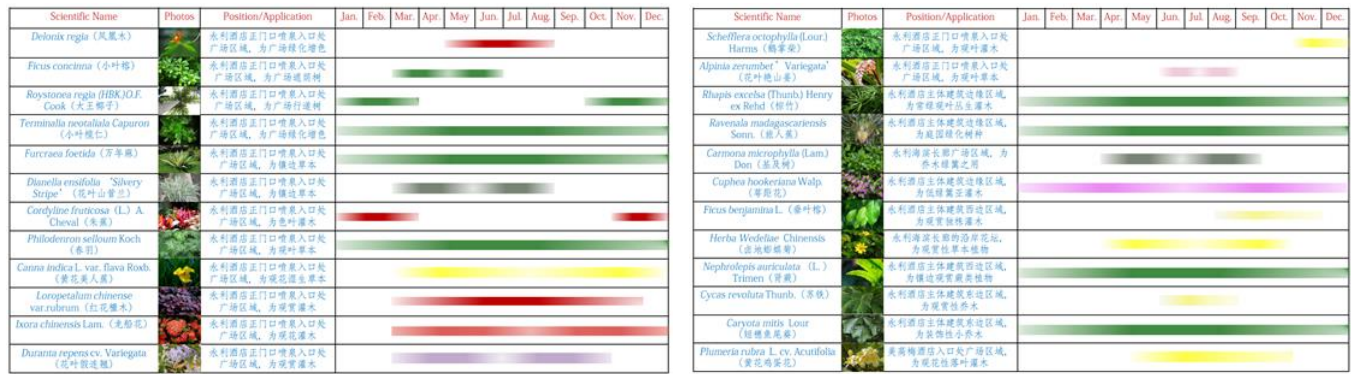


Figure 7. Analysis of plant seasons (Image source: drawn by the author)

From the seasonal changes in the above figure (Figure 7), it can be seen that the plants in this research site are mainly evergreen plants in southern China or subtropical regions, so most of the seasonal colors seen are green. In addition, the longer flowering period and the brighter flowers are *Loropetalum chinense* var. *rubrum*, *Ixora chinensis*, and *Cuphea hookeriana* Walp., and the flowers are purple-red and orange-red. Plants with yellow flower color, such as *Plumeria*, *Wollastonia dentata*, and *Canna indica* L. var. *flava* Roxb., are mainly concentrated in the summer stage. Without the seasonal changes of plants in spring, autumn and winter, the greening conditions are relatively general, so the richness of landscape greening here is also average, not to mention the continuous blooming of flowers throughout the four seasons. In addition to the blooming flowers in summer, winter and autumn are still two seasons with fewer ornamental plants. If there is no flower contrast in South China in winter, the field of vision will be evergreen. However, seasonal changes are not obvious enough. Needs to be improved.

4.2 Contribution of existing greenery to public space landscaping

The design of garden plant planting should first start with nature and the main functions of the garden green space. There are many functions of garden green space, and specific to a certain green space, it always has its specific main function. The main function of the street green space is to provide shade. While solving the shade, the issues of organizing traffic and the beauty of the city should also be considered. A comprehensive park, starting with its various functions, should have a square or a large lawn for collective activities, shade trees, gorgeous shrubs, dense forests, and sparse forests for quiet rest. The hospital garden should pay attention to the sanitary protection and noise isolation of the surrounding environment, dense forests can be planted around it, and more flowers and trees can be planted in the garden near the ward and diagnosis and treatment department for rest and viewing. The main function of factory greening is protection, while the front area of the factory and the surrounding office should be dominated by landscaping, and the rest of the green space in the remote workshop is mainly for the rest. The Martyrs' cemetery should pay attention to the creation of a commemorative artistic conception.

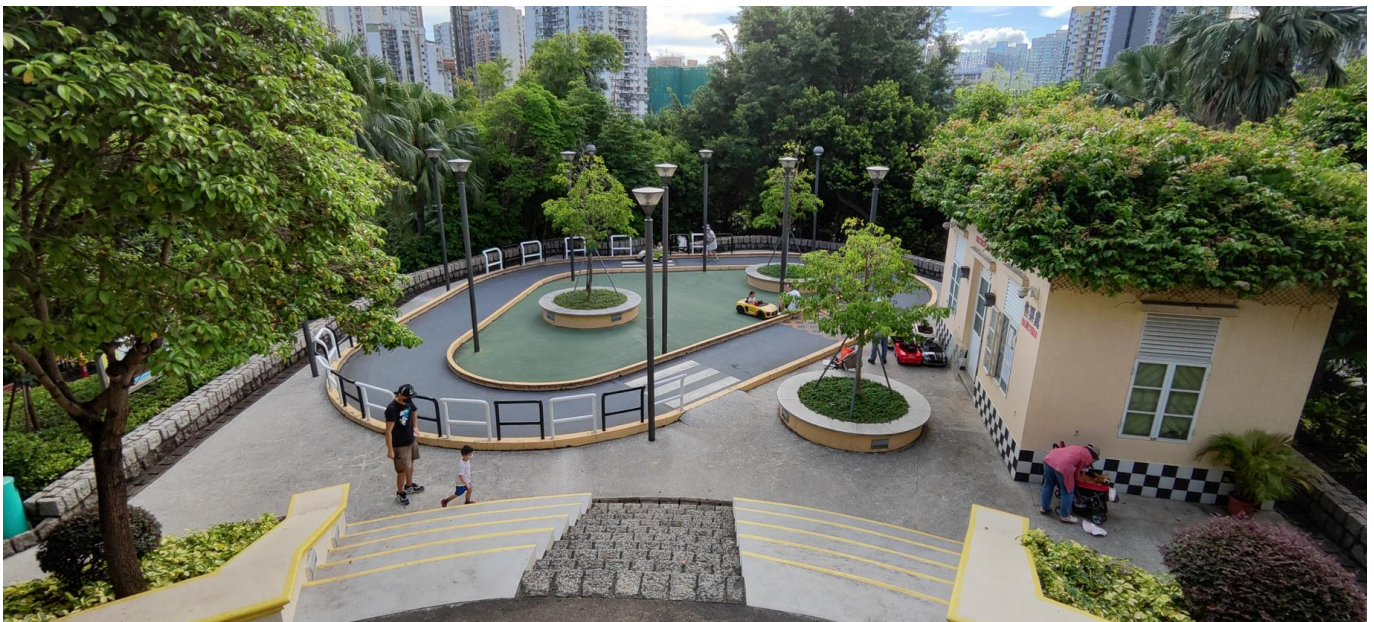


Figure 8. Regular planting in the center of the square (Image source: The author took the photo in August 2022)

Regular garden plants are planted in pairs and columns, while in natural garden green spaces, asymmetrical natural planting is used to fully express the natural posture of plant materials. According to the local environment and the requirements in the overall arrangement, different planting forms are used. For example, regular planting is often used near gates, main roads, plastic squares, and large buildings. In the vicinity of natural landscapes, lawns, and small asymmetrical buildings, natural planting is used. These traditional garden plant planting methods are also well reflected in Garden of Mountain Russa.



**Figure 9.** Formal Planting for Garden Paths (Image source: The author took the photo in August 2022)



**Figure 10.** Tree pond planting in children's playground (Image source: The author took the photo in August 2022)

## 5. Conclusion

### 5.1. Add Season Change Plants

More tree species with rich seasonal changes will be added to make up for the lack of current seasons, such as *Lagetstroemia speciosa*, which blooms from May to November in South China. *Cassia surattensis* Burm. f. (*C. glauca* Lam.) and *Syzygium jambos* (L.) Alston during flowering and fruiting spring. *Callistemon rigidus* R. Br., which blooms every spring and summer. *Brunfelsia latifolia* Benth is a bi-colored large-flowered mandarin duck jasmine (*Brunfelsia latifolia* Benth.), which blooms from spring to late autumn. The above plants are all my experience from living in South China all year round and visiting parks frequently. Macao is

close to Zhuhai, Guangdong, and the growth environment, conditions, and habits of plants are generally similar. Therefore, we can learn from the plant configuration experience of better parks in Guangdong, so the above tree species are recommended.



**Figure 11.** *Lagetstroemia speciosa*



**Figure 12.** *Cassia surattensis* Burm. f. (*C.glauca* Lam.)



**Figure 13.** *Syzygium jambos* (L.) Alston



**Figure 14.** *Callistemon rigidus* R. Br.



**Figure 15.** *Brunfelsia latifolia* Benth.  
(Image source: <https://zh.wikipedia.org/zh-hans/>)



### 5.2 Strengthen the post-maintenance of plants

Strengthen the maintenance of plants in the later stages of growth and maintenance. First, be familiar with the growth habits of plants and create an environment suitable for their growth. For example, *Philodendron selloum*, who is exposed to the sun in the open air in Macau, likes the temperature and shade but is not cold and light-resistant and avoids strong light. For irradiation, the suitable temperature is 18 °C to 25 °C.

Therefore, it is necessary to move the *Philodendron selloum* to a shady place in summer and avoid direct sunlight. In winter, it can be moved to a place with sufficient sunlight, and the overwintering temperature should be as high as 8 °C possible. Here, spring feathers should be transplanted to a shady place, or small trees or sub-arbors should be planted beside the *Philodendron selloum* to block the sunlight and create a good shady growth environment for the spring feathers. The second is to prevent and control plant diseases and insect pests in a timely manner. For example, ficus plants in South China often have yellow-brown or black spots, leaf curling, withering, early defoliation, and other symptoms of foliar diseases, which may be yellowing. Disease, leaf spots, soot, powdery mildew, etc. At this time, spraying protection is required. From June to August, spray 120 to 160 times the equivalent Bordeaux mixture or 70% thiophanate-methyl 700 to 800 times or 50% carbendazim once every 10 to 14 days. Wettable powder 500 times 800 times liquid.

### 5.3 Be alert to pests and diseases

Field visits found that the majority of *Schefflera heptaphylla* (Linnaeus) Frodin. If left untreated, it can cause damage to plants. *Schefflera heptaphylla* (Linnaeus) Frodin are mainly eroded by leaf spots, anthracnose, scale insects, red spiders, thrips and leaf miners, and other pests and diseases, and certain control measures must be taken.



**Figure 16.** *Schefflera heptaphylla* (Linnaeus) Frodin (Image source: The author took the photo in August 2022)

At the beginning of the disease, many small gray-brown or gray-white lesions appear on the back of the leaves and gradually form reddish-brown bumps. Gradually, small, sparse black dots visible by cleaning are visible. When the disease is severe, the spots aggregate to form large spots, and the entire leaves wither. For spraying chemicals at the early stage of the disease, you can choose 80% mancozeb 800 times solution + good humidity 3000 times spray for prevention and control. Drug prevention and control should be carried out in time after the onset of the disease, and 1000 times of 25% Shibaok EC or 500 times of 40% Chlorothalonil suspension can be sprayed.

The quality of plant maintenance in the park determines the environmental quality within the residents' living circle. Especially for small municipal parks such as Garden of Mountain Russa, which are built on mountains, more attention should be paid to the maintenance issues mentioned above.

**Funding:** This research was funded by China Youth Elite Project (Foundation) -One of the phased research results of the 2019 Youth China Walk Guangdong-Hong Kong-Macau Greater Bay Area SDGs project "Research on Sustainable Development of Urban Waste Recycling in Macau".

**Conflicts of Interest:** The authors declare no conflict of interest.

**Publisher's Note:** All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers.

**ORCID:** Yile Chen : <https://orcid.org/0000-0002-8424-8059>

## **References**

- [1] Bailey, S. K. (2007). *Strolling in Macau: A Visitor's Guide to Macau, Taipa, and Coloane*. ThingsAsian Press.
- [2] Kajdański, E. (2014). Pod polską banderą w portugalskim Makau. *Gdańskie Studia Azji Wschodniej*, 2014(Zeszyt 6), 48-68.
- [3] Puga, R. M. (2012). Representações da paisagem acústica de Macau na narrativa "Min-Pau-Lou"(1998), de Ana Maria Amaro. *Fragmentum*, 1(35), 55-62.
- [4] MORAIS, I. (2012). CHAPTER EIGHT JAN JACOB SLAUERHOFF'S THE FORBIDDEN REALM: IN CAMOES'S FOOTSTEPS FROM LISBON TO MACAU. *The City and the Ocean: Journeys, Memory, Imagination*, 142.
- [5] Edmonds, R. L., & Kyle, W. J. (1998). Land use in Macau: changes between 1972 and 1994. *Land Use Policy*, 15(4), 271-292.
- [6] Liang, Z. (2020). Analysis of Plant Landscape Planning in Macau Universities——Taking Macau University of Science and Technology as an Example. *Landscape and Urban Horticulture*, 2(1), 12-24.